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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,413	03/04/2002	Kazunori Mukasa	218957US8	1376
22850	7590	11/24/2003	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			DONG, DALEI	
			ART UNIT	PAPER NUMBER
			2875	

DATE MAILED: 11/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/086,413	MUKASA, KAZUNORI	
	Examiner	Art Unit	
	Dalei Dong	2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 10/086,413.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The

Applicant merely claimed apparent refractive index difference of the center core is 1.15 to 1.40%, however fails to disclose the value in which center core is compared to and the formula used to calculate the apparent refractive index difference of the center core.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,838,867 to Onishi in view of U.S. Patent No. 6,301,419 to Tsukitani.

Regarding to claims 1-7, and 10-18, Onishi discloses in Figures 4 and 4A, “the dispersion compensating fiber 100a (first embodiment) having the double cladding structure is a single-mode optical fiber the main ingredient of which is silica glass, which has a core region 110 having predetermined refractive indices, an inside cladding region 111 being a glass region provided on the periphery of the core region 110 and having a lower refractive index than the core region 110, and an outside cladding region 112 provided on the periphery of the inside cladding region 111 and having a higher refractive index than the inside cladding region 111 and a lower refractive index than the core region 110” (column 9, line 64 to column 10, line 8).

Onishi also discloses in Figures 4 and 4A, “a ratio $R_a (=2a/2b)$ of the outer diameter 2a of the core region 110 to the outer diameter 2b of the inside cladding region 111 is not less than 0.3 and not more than 0.5 and the outer diameter of the core region is not less than 3.5 μm and not more than 6.0 μm . A relative refractive index difference $\Delta n_{\text{sup.}}$ between the outside cladding region 112 and a portion with the maximum refractive index in the core region 110 is not less than 0.6% and not more than 1.4% and a relative refractive index difference $\Delta n_{\text{sup.-}}$ between the outside cladding region 112 and a portion having the minimum refractive index in the inside cladding region 111 is not less than 0.25% and not more than 0.65%” (column 10, lines 9-20).

Onishi further discloses in Figures 4 and 4A, “the abscissa of the index profile 200a shown in FIG. 4 corresponds to positions on the line L1 in the cross section (the plane normal to the traveling direction of signal light propagating) of the dispersion compensating fiber 100a. Further, in this index profile 200a, region 210 corresponds to the refractive index ($n_{\text{sub.core}}$) at each portion on the line L1 of the above core region 110, region 220 to the refractive index ($n_{\text{sub.clad1}}$) at each portion on the line L1 of the above inside cladding 111, and region 230 to the refractive index ($n_{\text{sub.clad2}}$) at each portion on the line L1 of the above outside cladding region 112. In this embodiment the radial index profile of the core region 110 is of the graded-index type, and the refractive index of the inside cladding region 111 is smaller than those of the other glass regions, so that depressions A are formed in the index profile 200a of the dispersion compensating

fiber 110a. Particularly, the index profile provided with such depressions A is called as a depressed cladding type profile” (column 10, lines 21-38).

Onishi furthermore discloses in Figure 10, “a table to show the simulation results. Eleven conditions were set as to the four parameters Δ_+ , Δ_- , $2a$, and $R_a (=2a/2b)$ and characteristic values of optical fibers were attained. Fibers (samples) prepared corresponding to the respective conditions are denoted by No. 1 to No. 11” (column 14, lines 36-40).

However, Onishi does not disclose an effective core area of 19 to 50 μm^2 .

Tsukitani teaches “as characteristics with respect to light having a wavelength of 1.55 μm , this dispersion-equalizing optical fiber has an effective area of 15 μm^2 or more, preferably 17 μm^2 or more, further preferably 19 μm^2 or more. Here, as disclosed in Japanese Patent Application Laid-Open No. HEI 8-248251 (EP 0 724 171 A2), the effective area A_{eff} is given by the following expression (1):
$$A_{\text{eff}} = \frac{\int_0^R |E|^2 r dr}{\int_0^R |E|^2 r dr}$$
 where E is the electric field accompanying the propagating light, and r is the radial distance from the core center” (column 3, lines 11-24).

Tsukitani also teaches “since the dispersion D and dispersion slope S at the wavelength of 1.55 μm satisfy the above-mentioned conditions in this dispersion-equalizing optical fiber, when the ratio between the length of the dispersion-equalizing optical fiber and the length of a single-mode optical fiber having a zero-dispersion wavelength in the 1.3- μm wavelength band is appropriately adjusted, the respective absolute values of dispersion and dispersion slope in the whole optical transmission line constituted by the dispersion-equalizing optical fiber and single-mode optical fiber can be

minimized (wavelength dependence can be reduced). Since the dispersion-equalizing optical fiber has an effective area of $15 \mu\text{m}^2$ or more preferably $17 \mu\text{m}^2$ or more, it effectively restrains nonlinear optical phenomena from occurring when disposed downstream from the single-mode optical fiber. For securing a higher transmission quality, it is preferable for the dispersion-equalizing optical fiber to have an effective area of $19 \mu\text{m}^2$ or more. As a consequence of such a configuration, the bending loss of the dispersion-equalizing optical fiber becomes 50 dB/m or less, preferably 10 dB/m or less with respect to light having a wavelength of $1.55 \mu\text{m}$ when wound at a diameter of 20 mm" (column 3, lines 25-46).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have adjust the effective core area of optical fiber of Onishi with effective core area of Tsukitani in order to achieve a lower dispersion and low loss and higher transmission quality. Furthermore, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Regarding to claims 8-9 and 19-20, it is old and well known in the art to utilize an optical fiber for a wavelength division multiplex transmission line, therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to have utilize the optical fiber for the wavelength division multiplex transmission line in order to suppress dispersion and loss during the transmission of the signal and further achieve a higher transmission quality.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following prior art are cited to further show the state of the art of composition of an optical fiber.

U.S. Patent No. 6,427,044 to Yanada.

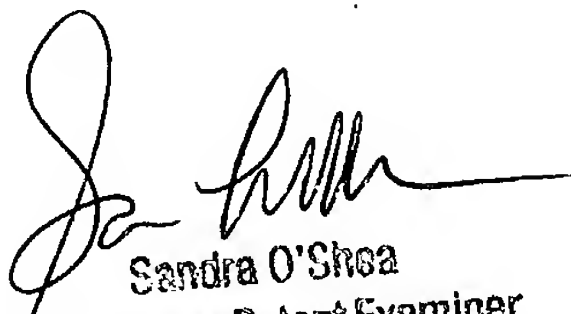
U.S. Patent No. 6,470,126 to Mukasa.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dalei Dong whose telephone number is (703)308-2870. The examiner can normally be reached on 8 A.M. to 5 P.M..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703)305-4939. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

D.D.
November 5, 2003


Sandra O'Shea
Supervisory Patent Examiner
Technology Center 2800